1155-133 The Six-Minute-Walk Test Better Reflects the Improvement in Valve Hemodynamics After Percutaneous Mitral Valvuloplasty for Mitral Stenosis

Jean Pierre Dery, Philippe Pibarot, Jean G. Dumesnil, Jean Jobin, Isabelle Laforest, Réjean Lamontagne, Martin Noël, Jean-Roch Boudreault, *Quebec Heart Institute, Sainte-Foy, Quebec, Canada.*

Background: It has been reported that changes in exercise capacity following percutaneous mitral valvuloplasty (PMV) do not necessarily correlate with changes in hemodynamic parameters on the resting echocardiogram.
Objective: To better characterize the relations between changes in hemodynamic parameters both at rest and during exercise and changes in exercise capacity in patients undergoing PMV for mitral stenosis.
Methods: We evaluated 12 patients with severe mitral stenosis before and 3 months after PMV. Evaluations performed included: Duke activity status index, a 6-minute-walk test (6MWT), an upright ergocycle exercise test with respiratory gas analysis (VO_2 max). During the latter, mitral mean gradient and effective orifice area were measured by Doppler echocardiography at rest, at 30-Watts steady-state exercise, and at peak exercise.
Results: Overall, the distance covered during the 6MWT correlated significantly with the mean gradient at 30-Watt exercise (r=0.47; p=0.02) but not with the mean resting gradient (r=0.33; p=0.11). Following PMV, mean gradient improved (P<0.01) by -4±4 mmHg at rest and by -9±9 mmHg at peak exercise and the change in distance covered during the 6MWT correlated well with the improvement in mean gradient both at rest (r=0.64; p=0.02) and during 30-Watt exercise (r=0.61; p=0.03). Both before and after PMV, effective orifice area increased during exercise but significantly more (p=0.02) after (+0.35±0.29 cm^2) than before PMV (+0.17±0.12 cm^2), suggesting improved valve flexibility after PMV. In contrast to the 6MWT, the Duke activity status index and the VO_2max did not correlate with rest or exercise echocardiographic parameters.
Conclusion: In patients undergoing PMV for mitral stenosis, the improvement in valve hemodynamics appears to be better characterized by an objective evaluation of endurance such as with the 6MWT. From a practical standpoint, the 6MWT is easy to perform and could be a useful adjunct for monitoring the results of PMV.

1155-134 Predictors of Restenosis and Long-Term Changes in Mitral Valve Area After Balloon Mitral Valvotomy With Inoue Balloon: A Long-Term (72-90 month) Clinical and Echocardiographic Study

Kewal C. Goswami, Nitish Naik, Vinay K. Bahl, Kewal K. Talwar, Subhash C. Manchanda, *All India Institute of Medical Sciences, New Delhi, India.*

Wilkins scoring system is a semi-quantitative scoring system used to predict restenosis after balloon mitral valvotomy (BMV) and thus produces inter-observer variability. The objective of this study was to prospectively assess predictors of restenosis, long-term changes in mitral valve area (MVA) and event free survival after BMV with Inoue balloon using a quantitative echocardiographic scoring system and compare it with Wilkins score. After BMV, 192 patients (mean age 26.7 + 8.9 years, 62.5% males) were followed-up for 82 + 6.8 months. Clinical and echocardiographic examinations were performed immediately before and after BMV and then at 6 monthly intervals. Twenty-six variables were studied for their effect on mitral valve (MV) restenosis. These included age; sex; rhythm; NYHA class;hemodynamic variables. Mitral valve morphologic variables studied included: MV leaflet thickness, length and mobility; diastolic MV excursion; chordal length; mitral annular (MVAn) diameter; subvalvular distance ratio (SDR); distance between mid-MVAn to left ventricular apex, base and tip of papillary muscle (PM); effective balloon dilating (EBD) area; EBD area to body surface area ratio and EBD diameter to MVAn diameter ratio. Twenty seven patients developed restenosis. Rate of loss of MVA in them was 0.129 cm2/year (vs 0.032 cm2/year in those without restenosis, p<0.001). On univariate analysis only SDR (0.349 + 0.033 vs 0.278 + 0.017, p<0.0001), mid-MVAn to tip of PM distance (25.2 + 3.8 vs 20.3 + 1.4 mm, p<0.01) and chordal length (5.1 + 2.9 vs 2.7 + 2.4 mm, p<0.05)were predictive of restenosis. Patients with restenosis had significantly higher Wilkins echo score (98.5 + 1.2 vs 6.9 + 1.2, p < 0.001). A shorter SDR and shorter mitral valve excursion were the only predictors of restenosis on discriminant function analysis. Event free survival was 74% at 7.5 years. Four patients required mitral valve replacement and 12 a redo-BMV on follow-up. In conclusion,BMV is a safe and effective procedure, providing event free survival to nearly three-fourth of patients at 7.5 years. Rate of loss of MVA is slower in less deformed valves. Subvalvular deformity identifies a subgroup with higher restenosis rates

1155-135 Mitral Balloon Valvotomy in 536 Consecutive Patients Using Inoue Balloon Technique: Long-Term Results (11 Years)

Mohamed Eid Fawzy, *King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia.*

Background: The long-term results of mitral balloon valvotomy (MBV) are not adequately studied.
Methods: 536 patients aged 31 ± 11 (mean ± SD) years, underwent MBV for severe mitral stenosis (MS) using Inoue balloon technique, over 11 year period. Clinical evaluation and echocardiographic (echo) examination were carried out before and immediately after MBV and annually thereafter. Mitral valve morphology (MVM) was evaluated and semiquantitated using mitral echo score (MES). Patients were divided into 2 groups according to MES at the time of MBV: group A (MES ≤ 8) and group B (MES > 8). The study group consisted of 362 pts who have completed 1-11 (mean 4.8 ± 2.7) year follow-up. Comparison of hemodynamic variables was done using student t-test. Chi-square/ Exact-test was used to study categorical variables. Logistic regression analysis was used to identify predictors of restenosis. Event free survival was plotted using the Kaplan Meier test.
Results: The immediate and long-term hemodynamic results are as follows (Table 1). Restenosis in all patients is 16.2%. Logistic regression analysis identified MES and post procedure MVA < 2.0 cm as strong predictors of restenosis (P < 0.005 and P < 0.05 respectively). The event free survival for 1, 4, 6, 8, 10 years was 0.99, 0.95, 0.88, 0.77, 0.48 for group A and 0.98, 0.82, 0.74, 0.52, 0.18 for group B respectively.
Conclusions: (1) Long-term results of MBV is good; (2) Unfavorable MVM (MES > 8) and post procedure MVA < 2.0 cm^2 are powerful independent predictor of restenosis.

	Group A (n = 274)	Group B (n = 88)	P Value
Age	31 ± 10.9	34 ± 11.2	P < 0.05
MVA before cm^2	0.9 ± 0.16	0.9 ± 0.19	P = 0.2
MVA immediate cm^2	2.00 ± 0.3	1.8 ± 0.27	P < 0.0001
MVA follow-up cm^2	1.8 ± 0.36	1.5 ± 0.38	P < 0.0001
Restenosis	32 (12%)	22 (25%)	P < 0.001

1155-136 Rectilinear Biphasic Rather Than Monophasic Waveforms for Transthoracic Cardioversion of Patients With Rheumatic Heart Disease and Longstanding Atrial Fibrillation After Corrective Mitral Valve Procedures

Daniel Schutte, Carlos Libhaber, Karen Sliwa, Riaz Motara, Arthur Kibirige, John Kachope, Firanda Peters, Pinhas Sareli, *Chris Hani Baragwanath Hospital, Johannesburg, South Africa.*

Background: The efficacy of transthoracic cardioversion (CV) of atrial fibrillation (AF) can be enhanced by biphasic, as compared to standard monophasic damped sinusoidal waveform shocks, and achieved with lower energy and current. The duration of AF and left atrial size have been cited as important predictors of CV success.
Methods: Forty-three patients (mean age 48±12) with persistent AF after corrective procedures for rheumatic mitral valve disease (valve replacement, repair or balloon valvotomy) received transthoracic CV using a rectilinear, biphasic waveform (constant current 6 ms first phase, followed by a truncated exponential 4 ms second phase). Mean duration of AF was 86 ± 55 months (range 10-217 months). Duration of AF was > 2 years in 34 (83%) of patients. Mean left atrial diameter 52 ± 8 mm. CV was performed at least 3 months after surgery (mean duration 76 months). Patients were treated with amiodarone (68%) or sotalol (32%) for one month. Incremental shocks from 30 J to a maximum of 200 J were delivered. CV was done with paddles compressed in the antero-lateral (AL) position and if unsuccessful the antero- posterior position (200 J).
Results: Forty-one (95%) patients could be successfully cardioverted, all but one in the AL position, with a mean of 1.8 shocks (range 1-5). The mean successful defibrillation energy was 83.9 ± 49.6 J stored and 94.2 ± 57.8 J delivered (impedance compensated) and the mean current was 12.5 ± 4.5 A. Mean transthoracic impedance was 63.5 ±14.7 Ohm. CV success with 30 J, 75 J and 120 J was 19%, 58% and 84% respectively. These results compare favorably with a similar group of 18 patients, previously reported from this unit, cardioverted with a monophasic waveform with a success rate of 61% (vs. 95%, p=0.002) and mean successful energy of 205 ± 80 J (vs. 83.9 ± 49.6 J, p<0.0004).
Conclusion: A high rate of success was achieved using rectilinear biphasic shocks for transthoracic CV in this population with corrected rheumatic mitral valve disease with longstanding AF and marked left atrial enlargement. This could be achieved with lower energy and current than reported for conventional monophasic waveforms and may obviate the need for internal CV.

POSTER SESSION

1180 Valve Surgery

Tuesday, March 19, 2002, Noon-2:00 p.m.
Georgia World Congress Center, Hall G
Presentation Hour: 1:00 p.m.-2:00 p.m.

1180-131 Postoperative Myocardial Wall Stress in Patients With Chronic Aortic Insufficiency: Ross Procedure Versus St. Jude Mechanical Aortic Valve Prosthesis

Pavlos Moustakidis, Brian P. Cupps, Hersh S. Maniar, Giridhar Vedala, Lisa De Las Fuentes, Thoralf M. Sundt, Nicholas T. Kouchoukos, Victor G. Davila-Roman, Michael K. Pasque, *Washington University, St. Louis, Missouri, Missouri Baptist Hospital, St. Louis, Missouri.*

Background: Persistently elevated left ventricular (LV) wall stress, contributes significantly in the observed sub optimal postoperative results in patients with aortic insufficiency (AI). However, the impact of the valve type on LV stress has not been studied. We compared the effect of Ross procedure and St. Jude mechanical aortic prosthesis on the postoperative distribution of stress.
Methods: MRI was performed on 23 normal volunteers (Age: 28±9) and 19 patients (Age: 45±13) with severe AI. Follow-up postoperative studies (5.9±1.4 months) were obtained in 12 patients who underwent Ross procedure (6) and St. Jude (6) aortic valve replacement (AVR). Cardiac models were constructed from MRI images and were loaded with pressures derived from calibrated carotid artery tracings. LV end-systolic stress (ESS) was calculated in six wall segments using Finite Element Analysis.
Results: Preoperatively, ESS was significantly higher in the AI group (n=19), globally (154700±31711 vs. 96781±23185 dynes/cm2, p<0.001) and regionally (p<0.001 for all segments). After AVR, wall stress significantly decreased (globally and regionally, p<0.001 for all) in both the Ross procedure and St. Jude aortic valve prosthesis groups.